

given to the above characteristics, therefore, *C. arenicola* appears to be more closely related to *C. sibirica* than to either the *C. perfoliata* or the *C. spathulata-gypsophiloides* complexes.

*Claytonia saxosa* is diploid with  $x = 8$  ( $2n = 16$ ; CA, Siskiyou Co., Scott Valley, mouth of Heartstrand Gulch, Miller 488). Its corollas are showy, with pink petals 6–8 mm long, and the species is putatively outcrossing, as one would also suspect of the large-flowered, diploid *C. gypsophiloides*. In the material of *C. saxosa* we have examined, the racemes are completely ebracteate (contrary to a statement in the key by McNeill, op. cit., p. 801). The seed coat of *C. saxosa* is prominently tubercled and dull-surfaced as in *C. spathulata* and *C. gypsophiloides*, although the shape of the tubercles is slightly different. Although paired with *C. perfoliata* in some of the numerical analyses reported by McNeill (op. cit.), *C. saxosa* seems to be relatively more distant from that species than it is from *C. gypsophiloides* and *C. spathulata*, if one assumes that chromosome number and seed coat morphology are conservative indicators of genetic relationship.

Voucher specimens and permanent microslides for the chromosome counts reported in this study are deposited in OSC. —JOHN M. MILLER and KENTON L. CHAMBERS, Department of Botany and Plant Pathology, Oregon State University, Corvallis 97331.

ON THE RELATIONSHIPS OF *CHENOPODIUM FLABELLIFOLIUM* AND *C. INAMOENUM*.—Taxonomists have disagreed on the treatment of *C. inamoenum* Standley (North Amer. Flora 21:1–93. 1916; type: Arizona-Mexico border near Douglas, Meares 2286, US) and *C. flabellifolium* Standley (op. cit.; type: Baja California, San Martín Island, 1897, T. S. Brandegees s.n., UC 116454).

Standley placed *C. inamoenum* in "group" Leptophylla together with several other species. One of the species was *C. hians* Standley (op. cit.; type: near Dulce, New Mexico, 1911, Standley 8129, US). Another species included in this group was *C. leptophyllum* (Nutt. ex Moq.) S. Wats., which was originally described as *C. album* var. *leptophyllum* Nutt. ex Moq. [DeCandolle, Prod. 13(2):71. 1849; type: Gordon 260, K, with the locality given as LaPlatte (on the Platte River?)]. Aellen and Just (Amer. Midl. Naturalist 30:47–76. 1943) considered *C. inamoenum* to be the same as *C. leptophyllum*. Wahl (Bartonia 27: 1–46. 1952–53) commented that the type of the former "does not agree with any material seen". Examination of the type specimen reveals that it is the top of a plant with what appear to be few primary leaves and with many seeds. The seeds (actually fruits, since the pericarp is attached) of the type closely resemble those of *C. leptophyllum* in being 1.0 mm or less in diameter and with black pericarps. A couple of what I interpret as primary leaves have two very weakly developed veins. *Chenopodium hians* typically has leaves oblong to linear in outline with a midrib and two well developed lateral veins whereas the leaves of *C. leptophyllum* bear only a strong midrib and no discernable lateral veins. While no definitive conclusion can be reached regarding the type of *C. inamoenum*, the seed characters are strong evidence for its being considered as nearer to *C. leptophyllum*.

*Chenopodium flabellifolium* was viewed by Standley (op. cit.) as closely related to the *C. neomexicanum* complex, since he placed it in his "group" Fremontiana with several other species having basally lobed leaves. These other taxa included *C. neomexicanum* Standley, *C. arizonicum* Standley, *C. palmeri* Standley, and *C. parryi* Standley, all of which he described in this same paper in 1916. In an earlier paper (Madroño 22:185–195. 1973), I considered the types of these names to be conspecific, and *C. lenticulare* Aellen, (Feddes Repert. Spec. Nov. Regni Veg. 26:31–64, 119–160. 1929) was likewise considered to belong to the same species. Whereas Standley considered *C. flabellifolium* to be related to *C. neomexicanum*, Aellen and Just (op. cit.) placed the former in synonymy under *C. opulifolium*, which is a sparingly introduced European species (Schrader in Koch and Ziz, Cat.

pl. Palat. 6, 1814, type not seen). Wahl (op. cit.) treated *C. flabellifolium* in the same manner as Aellen and Just, but he added "probably" parenthetically after the name. This I take as an indication of doubt concerning the proper placement of this species. Wahl, who had a remarkable understanding of *Chenopodium* in North America despite limited field work, did not publish further on the relationships of *C. inamoenum* and *C. flabellifolium*. He did, however, annotate a number of specimens in various herbaria and these annotations suggest that in later years he came to quite a different conclusion on relationships than was expressed in his papers. Wahl annotated the type of *C. flabellifolium* as *C. inamoenum*, and moreover he indicated that types of both are conspecific with the type of *C. arizonicum* (type: Arizona, Santa Rita Forest Reserve, D. Griffiths 5982, US). Thus, if one were to combine this concept of Wahl with my latest treatment of the *C. neomexicanum* complex in which I consider the types of *C. arizonicum*, *C. lenticulare*, *C. neomexicanum*, *C. palmeri*, and *C. parryi* to be conspecific, then one would have these five names plus *C. flabellifolium* and *C. inamoenum* refer to one species. This is not tenable, and I shall present my concepts of relationships among these species.

The type of *C. flabellifolium* is similar to that of *C. neomexicanum*. The lower and primary leaves are about as wide and as long and have mostly bipartite basal lobes. The leaf shape falls easily into the variation encountered in *C. neomexicanum*. The more mature seeds measure 1.1–1.2 mm in diameter and the pericarp is strongly attached. The type of *C. flabellifolium* differs from *C. opulifolium* (as I understand it) in several respects, the most notable being the more strongly keeled sepals of the latter. In my opinion, *C. flabellifolium* is closely related to *C. neomexicanum*, and indeed they may be conspecific. I have found only two collections in addition to the type collection that could be referred to *C. flabellifolium*, and both were made prior to the present century. The question of whether or not *C. flabellifolium* is conspecific with *C. neomexicanum* cannot be answered with certainty at present; however, there is no question that the types of *C. flabellifolium* and *C. inamoenum* are distinct. *Chenopodium inamoenum* is probably the same as *C. leptophyllum*, although the depauperate nature of its type specimen precludes a confident decision.

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